

LISTING OF CLAIMS

What is claimed is:

1. (Currently amended) A process for making a porous catalyst, comprising
 - a) providing an aqueous solution containing a nanoparticle precursor;
 - b) forming a composition containing nanoparticles;
 - c) adding a first catalytic component or precursor thereof and a pore-forming agent to the composition containing nanoparticles and allowing the first catalytic component precursor, the pore-forming agent, and the nanoparticles to form an organic-inorganic structure a clear solution;
 - d) removing water from the organic inorganic structure; and drying the clear solution so as to allows an organic-inorganic material gel structure to form; and
 - e) removing the pore-forming agent from the organic-inorganic structure so as to yield a porous catalyst.
2. (Currently amended) The process according to claim 1 wherein step e) includes adding a dissolved salt of a the first catalytic component precursor is a metal salt.
3. (Currently amended) The process according to claim 1 wherein the pore-forming agent is a cationic surfactant, anionic surfactant, or zwitterionic surfactant, or combinations thereof.
4. (Currently amended) The process according to claim 1 wherein steps (b) and (c) are performed concurrently.
5. (Original) The process according to claim 1 wherein the nanoparticles are nanoparticles of a metal or metal oxide.
6. (Currently amended) The process according to claim 1, wherein (d) comprises supercritical drying of the clear solution to form an aerogel further including the step of aging the organic-inorganic structure.

7. (Currently amended) The process according to claim 24, wherein the metal salt comprises ammonium metavanadate, ammonium metatungstate, or combinations thereof, wherein steps a) through e) are carried out such that the organic-inorganic structure is a gel network.

8. (Currently amended) The process according to claim 1 wherein the organic-inorganic material gel structure formed in step e)(c) is carried out such that the porous catalyst is an aerogel or a xerogel.

9. (Currently amended) The process according to claim 1 wherein the porous catalyst comprises nanoparticles in a coating or coated with a first catalytic component layer, wherein the surface density of the first catalytic component is greater than the monolayer surface density for the material comprising the first catalytic component layer is amorphous.

10. (Currently amended) The process according to claim 1 wherein the porous catalyst comprises nanoparticles in a coating or coated with a first catalytic component layer, wherein the surface density of the first catalytic component layer is greater than 4 molecules per nm².

11. (Original) The process according to claim 1 wherein the first catalytic component is non-crystalline in the porous catalyst.

12. (Currently amended) The process according to claim 1 wherein the first catalytic precursor component is at least partially polymerized in the porous catalyst.

13-18. (Cancelled)

19. (Previously Presented) The process according to claim 1, wherein the nanoparticles comprise zirconium oxide nanoparticles, titanium oxide nanoparticles, aluminum oxide nanoparticles, silicon oxide nanoparticles, or combinations thereof.

20. (Currently amended) The process according to claim 1, wherein the first catalytic component or precursor thereof comprises vanadium, tungsten, niobium, tantalum, rhenium, molybdenum, or combinations thereof.

21. (Previously Presented) The process according to claim 1, wherein the pore-forming agent comprises an ethylene oxide block copolymer.

22. (Previously Presented) The process according to claim 1, wherein the pore-forming agent comprises a non-ionic poly(ethylene oxide)-poly(propylene oxide)-poly(ethylene oxide) triblock copolymer.

23. (Previously Presented) The process according to claim 22, wherein the pore-forming agent comprises $\text{EO}_{20}\text{PO}_{70}\text{EO}_{20}$, $\text{EO}_5\text{PO}_{70}\text{EO}_5$, $\text{EO}_{106}\text{PO}_{70}\text{EO}_{106}$, $\text{EO}_{17}\text{PO}_{60}\text{EO}_{17}$, or combinations thereof.

24. (Previously Presented) The process according to claim 1, wherein the pore-forming agent comprises hexadecyl trimethyl ammonium, cetyl trimethyl ammonium bromide, or combinations thereof.

25. (Previously Presented) The process according to claim 1, wherein the nanoparticles are zirconium oxide nanoparticles, the first catalytic component or precursor thereof comprises tungsten, and the pore-forming agent comprises $\text{EO}_{20}\text{PO}_{70}\text{EO}_{20}$, $\text{EO}_5\text{PO}_{70}\text{EO}_5$, $\text{EO}_{106}\text{PO}_{70}\text{EO}_{106}$, $\text{EO}_{17}\text{PO}_{60}\text{EO}_{17}$, or combinations thereof.

26. (Currently amended) The process according to claim 1, wherein the nanoparticles are zirconium oxide nanoparticles or aluminum oxide nanoparticles, the first catalytic component or precursor thereof comprises tungsten or vanadium, and the pore-forming agent comprises $\text{EO}_{20}\text{PO}_{70}\text{EO}_{20}$, $\text{EO}_5\text{PO}_{70}\text{EO}_5$, $\text{EO}_{106}\text{PO}_{70}\text{EO}_{106}$, $\text{EO}_{17}\text{PO}_{60}\text{EO}_{17}$, or combinations thereof.

27. (New) The process according to claim 1, wherein (e) comprises calcining the organic-inorganic structure to remove the pore-forming agent.